

13 June 1997

Monthly Program Progress Report

For the period from 1 April 1997 through 31 May 1997

Project: SH-60R Operator Machine Interface Enhancement (SHOMIE)

CHI Systems Project 9704

CDRL A001

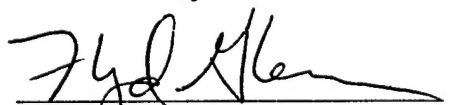
Contract Number: N00421-97-C-1133

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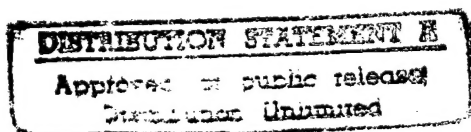
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REPORT FOR THE PERIOD 4/1/97 THROUGH 5/31/97

1. Project Abstract

A systematic approach, designated SH-60R Operator-Machine Interface Enhancement (SHOMIE), is proposed for developing decision aid enhancements to the SENS0 and ATO crewstations of the SH-60R aircraft which is currently under development by the Navy. The methodology begins with determination of functional performance requirements via a technique based primarily, but not exclusively, on cognitive task analysis. Cognitive performance limitations are determined both analytically and empirically and then used to derive functional requirements for decision aid concepts to overcome the identified limitations. Relevant software and algorithmic techniques for realizing the desired functionality are then derived from an evaluation of viable candidates obtained from a taxonomic analysis of aiding technologies. Finally, the decision aid concepts are specified as structured architectural designs which are then implemented as software prototypes.

The Phase I effort will focus primarily on the SENS0 crewstation because the SENS0's tasks are expected to be changed more radically than the ATO's with the introduction of new sensor information processing software. Also to restrict the scope of the effort to a manageable level and still assure operational relevance, we propose to focus on the domain of acoustic search and localization in littoral ASW missions. CHI Systems has worked extensively in this domain, having developed a variety of ASW decision aids, training tools, cognitive task analyses, and testbeds, all of which will greatly facilitate the development of the decision aids to be formulated by the SHOMIE methodology.

2. Project Status Summary

As a result of changes in assignments at NAVAIR, it has taken longer than expected to obtain key program documents which are critical to this effort. A useful core set of documents was finally obtained in the middle of May, three months after the start of this project, and we accordingly plan to request a three-month, no-cost extension in the period of performance to this contract. Thus, we now have the materials that we need to accomplish the planned tasks and have begun working on the first task (development of a cognitive model representation for the SENS0).

3. Progress During the Current Reporting Period

Work during this period focused primarily on obtaining the documents and associated information needed to perform this project. Several email and telephone communications were made with Ms. Becky Morgan in this regard. Other contacts that were made for this purpose were Mr. Joe Kern (previously of NAWCAD), LCDR Mike Holmes (previously of NAWCAD, currently at NAMRL), Mr. Paul Linton (Sikorsky), Dr. Norm Warner (NAWCAD), and Ms. Peggy

Heffner (NAWCAD). The following documents were obtained from these contacts (mostly from Ms. Becky Morgan):

- Loral Federal Systems. (11 March 1996) "LAMPS MK III Block II Upgrade, Design Description Document." Loral Doc. No. 6953823D. Owego, NY: Loral Federal Systems. (U)
- NAWCAD. (8 November 1996) "Operational Employment Considerations (OEC) for SH-60R Development Program." Patuxent River, MD: NAWCAD T&E Strategic Planning Office. (U)
- Rhatigan, B. (30 April 1997) "DSS Functions." Owego, NY: Lockheed Martin Electronics Platform Integration Group. (U)
- Lockheed Martin Federal Systems. (26 August 1996) "Human Engineering Design Approach Document - Operator." Lockheed Martin Document No. 6953785C. Owego, NY: Lockheed Martin Federal Systems. (U)
- GAO. (August 1991) "Status of the Navy's Airborne Low Frequency Sonar Program." GAO Report No. NSIAD-91-208. Washington, DC: U.S. General Accounting Office. (U)
- Kern, J.E. & Holmes, P.M. (31 October 1989) "Operator Performance Assessment - LAMPS MK-III Block II Upgrade." Report No. NADC-90035-60. Warminster, PA: Naval Air Development Center. (U)
- NAVAIR. (1 July 1996) "SH-60R Multi-Mission Helicopter Scenarios for the Year 2005 Revision 6." Alexandria, VA: Naval Air Systems Command PMA-299. (C)

All of these documents have been reviewed and are now being used to define a coarse, COGNET-based cognitive representation of SENSO tasks for acoustic localization of a subsurface target in a littoral ASW mission.

4. Problems

The chief problem of current concern is the delay in obtaining the necessary documents in order to enable the analytic work to proceed. This problem can be effectively resolved with an appropriate contract extension, which will be requested shortly.

5. Plans for the Next Reporting Period

We will submit a request for a 3 month, no cost extension in contract period of performance to the Contracting Officer. We plan to complete the specification of a cognitive model representation for the SENSO (Task 1) and to begin identification of decision making and embedded training limitations (Task 2) as well as definition of enhanced OMI functionality (Task 3). We intend to contact subject matter experts (SMEs) in the Navy and at Lockheed Martin, as available, to evaluate our determinations on these tasks. In continuing analyses and SME consultation, we will be attempting especially to identify individual differences in SENSO performance with ALFS usage which would warrant adaptive decision aiding.

6. Task and Budget Status

As of 31 May 1997, 14.5% of the Phase I base period budget (\$70,000) had been expended, with all of that effort addressing general collection of project information and pursuit of Task 1 (cognitive model development).